United States Department of Agriculture
Weather Bureau
Washington

Office of the Chief.

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CIRCULAR

Instructions for Reporting Airplane Observations in English Units
Along the Airways

1. Airplane observations are regularly made under contract at Atlanta, Chicago, Cleveland, Dallas, and Omaha. These flights provide data on the heights of the bases and tops of clouds entered, temperature, humidity, the occurrence of precipitation, icing conditions, etc., to heights of 16,000 feet encountered during the flight. As such, they constitute extremely valuable information for use along the airways. It is the purpose of this Circular to provide a proper and concise method for the transmission of these data in English units by teletype and radio for use of all stations on such circuits.

2. Information concerning the "levels" telegraphed will be found in Paragraph 184 of Circular P, "Instructions for Making Aerological Observations". For the purpose of the English unit reports no change is involved regarding these.

3. The following plan will be used in transmitting the reports in English units by radio and teletype along the airways beginning November 15, 1932.

4. The reports will be designated as "Airplane Observations".

5. The reports will begin with the station designation (teletype call letters) followed, in order, by the time to nearest minute (local standard) of take-off (24-hour clock), the abbreviation "APOBS", (Airplane Observation), the abbreviation "Elvtn" (Elevation), the elevation of the station in hundreds, or thousands and hundreds, of feet to the nearest hundred above sea level, and the abbreviation "SFC" (surface) followed by the surface temperature, and dew-point in Fahrenheit degrees. For example, using the above abbreviations:

CV(Cleveland) 0512ES APOBS Elvtn/8/hnd/ Sfc/2/M3.....

6. This heading is then to be followed by the same data as would be included in a telegraphed message (see Section IX, Circular P), of the flight. except that the temperature of the dew point will be substituted for the relative humidity. However, in order that the data may be of maximum value for airways use they will be given in the following manner:

(a) The elevation of the level for which the data are given will be indicated to the nearest hundred feet above sea level.

(b) Following the elevation will be given the corresponding temperature in degrees Fahrenheit, using the letter "M" for indicating temperatures below zero.

(c) Following the temperature will be given the temperature of the dew point in degrees Fahrenheit using the letter "M" for indicating temperatures below zero.

7. The data for each level shall be regarded as a unit and transmitted without spaces but with the various items separated by an oblique line, each group to be separated from other groups by a space. For example: 17/28/22 30/22/20.

8. Following the regular data for the levels all pertinent remarks relative to clouds, precipitation, thunderstorms, etc., will be inserted. These will be abbreviated by use of the regular authorized abbreviations whereever possible. Clouds will be given in the regular cloud abbreviations and where the heights (to nearest hundred feet above sea-level) of the base or top, or both, are known, these will be given as follows: 10/STCU/W21/45. (10 ST CU west, base 2100, top 4500 ft.). 8/AST/NW/102/U (8 A ST Northwest, base 10,200 ft., top, not reached.)

9. Where the pilot encounters a layer of clouds above a lower layer which cannot be seen from the ground and the direction therefore indeterminable, the direction for the upper layer will be omitted, but the amount, type and height of the base and top will be given, if practicable.

10. Following the cloud data, precipitation data are to be given. This will be accomplished by entering the word for type of precipitation, i.e., rain, snow, mist, hail, etc., followed by the lowest height (to nearest hundred feet above sea level) encountered, including "surface" if occurring there, and the greatest height observed. For example, assuming rain is occurring at the surface at the start of the flight and persists to 6000 feet; this would be entered as: "Rain/SFC/60", or if encountered at 3000 ft., and ending at 5500 ft., it would be entered as, "Rain/30/55". If snow or some other form of precipitation occurred above this, the following illustrates the method of indicating it, "Rain/30/55 Snow/55/u", the "u" showing that the top of the snow was not reached.

11. Icing conditions will always be reported when encountered and will be entered in the report following the precipitation when this is occurring or encountered or if not, the cloud data, using the term "icing" to indicate the condition. Thus: "Icing/30/42", "icing/50/u". The latter example would indicate that the pilot did not reach the top of the icing condition. Heights will be indicated to the nearest hundred feet above sea level.

12. Unusual or severe turbulence ("bumpiness") is to be indicated by the insertion of the term "Extu" followed by the height limits (nearest hundred feet above sea level) in which it occurs. Thus: "Extu/SFC/100", "Extu/41/98", etc.

13. Thunderstorms are to be indicated directionally if observed in the distance by the pilot. Also sandstorms, dust storms, tornadoes, or other phenomena of interest.

14. Filing time will be indicated at the end of the message, but no signature will be included.

Transmission of Reports

15. The English-unit reports are to be prepared as promptly as practicable after completion of the flight and immediately filed with the Department of Commerce teletype or radio station for transmission over all communi-

cations channels from the point of origin, i.e., it will be placed on all teletype and radio circuits emanating from the station at which the observation was taken. As in the case of other data, one relay between circuits is permissible and this is being arranged with the Department of Commerce so that it will be done in each practicable case without specific request by Weather Bureau officials. It is contemplated that the data will be broadcast and schedules for this will probably be furnished later by the Department of Commerce.

Examples of Reports

(All altitudes above sea level; all temperatures in degrees Fahrenheit.)

Station	DL	Dallas, Texas.
Time	0245CS	2:45a.m., C.S.T.
Type of Observation	APOBS	Airplane observation.
Station elevation	ELVTN/5/HND	Elevation 500 feet.
Surface level	SFC/52/50	Surface; temp. 52; dew point 50
	25/44/44	2500 feet; temp. 44; dew point 44.
	35/53/53	3500 feet; temp. 53; dew point 53.
	68/46/46	6800 feet; temp. 46; dew point 46.
Significant levels:-		
	82/40/40	8200 feet; temp. 40; dew point 40.
	100/32/32	10000 feet; temp. 32; dew point 32.
	116/25/23	11600 feet; temp. 25; dew point 23.
	140/19/16	14000 feet; temp. 19; dew point 16.
Clouds	10/NB/SE/7/125	Ten-tenths nimbus, direction southeast, base 700, top 12500 feet.
Precipitation	HVY RAIN/SFC/125	Heavy rain, from surface to 12500 feet.
	HAIL/120/125	Hail encountered from 12000 to 12500 feet.
Icing conditions	ICING/102/125	Plane accumulated ice from 10200 to 12500 feet.
Turbulence	EXTU/30/125	Excessive air turbulence from 3000 to 12500 feet.
Thunderstorms	THDR HEARD	Thunder heard
	LTNG/SE/SW/NW	Lightning observed in southeast, southwest and northwest
Time group	0400	Filed 4:00 a.m.

The above would be written thus; DL 0245CS APOBS ELVTN/5/HND SFC/52/50 25/44/44 35/53/53 68/46/46 82/40/40 100/32/32 116/25/23 140/19/16 10/NB/SE/7/125 HVY RAIN/SFC/125 HAIL/120/125 ICING/102/125 EXTU/30/125 THDR HEARD LTNG/SE/SW/NW. 0400

Other examples follow:-

CV 0515ES APOBS ELVTN/8HND SFC/28/24 32/20/20 61/18/6 78/17/6 100/15/11 152/-2/-8 10/NB/W/21/45 8/CIST SNOW/SFC/25 ICING/23/45. 0558

CG 0430CS APOBS ELVTN/6HND SFC/34/30 40/23/23 56/32/20 84/26/10 131/12/M2 158/2/M10 10/STCU/W/22/47 MIST/SFC/22. 0527

OA 0415CS APOBS ELVTN/1THSND SFC/49/40 28/57/44 80/40/40 98/29/28 111/27/20 138/16/8 160/10/0 2/CI/W 4/STCU/SW/72/78 6/ACU/W/100/U EXTU/30/62/ 0502

DL 0600CS APOBS ELVTN/5/HND SFC/72/67 13/70/60 20/68/66 41/58/56 47/50/45 53/48/47 62/52/52 132/15/15 170/12/7 10/STCU/NE/62/144 RAIN/89/104 SNOW/104/120 ICING/103/144.

C. F. Marvin,
Chief of Bureau.